

Remarks

**I. Status of the claims**

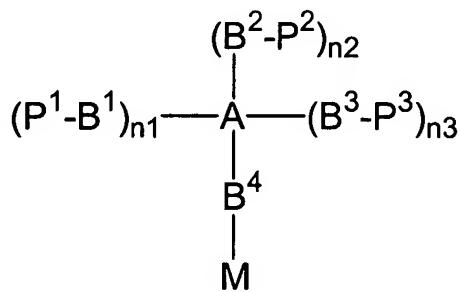
Claims 1-7 and 10-13 are pending in this application. Applicants acknowledge the Examiner's finding of allowability for claims 12 and 13 if they were re-written in independent form. All other claims were rejected as obvious in view of a cited reference.

**II. Rejections under 35 U.S.C. § 112, second paragraph**

Claims 1-7 and 10-13 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

The Examiner commented that it did not appear possible for group A to be defined as recited in claim 1. Group A in formula I of claim 1 may represent a nitrogen atom, a carbon atom, a group -CR<sup>1</sup>- or an aromatic or alicyclic group. The Examiner mentioned that the formula appeared to permit four bonds to group A, which should exclude the possibility of group A as being a nitrogen atom (which has a valence of three) or being a group -CR<sup>1</sup>- (where the carbon atom already has a bond to R<sup>1</sup>). Applicants respectfully traverse this rejection.

The polymer of claim 1 comprises units of formula (I):



with a proviso that  $1 < n^1 + n^2 + n^3 < 4$ . The proviso to the definitions of n<sup>1</sup>, n<sup>2</sup> and n<sup>3</sup> shows that the sum of them is either 2 or 3. One skilled in the art would recognize that the sum of the n groups would be 2 in the case of A representing a nitrogen atom or -CR<sup>1</sup>-, and would be 3 in the case of A representing a carbon atom. One skilled in the art would understand that in light of the valency requirements of the groups discussed

by the Examiner. The scope of the claims in this respect should therefore be clear without amendment.

The Examiner indicated that the reference to both the formula (I) and M as being "repeating units" was indefinite. Applicants have amended the claims to make clear that claim 1 covers polymers comprising units of formula (I). This amendment does not narrow the scope of the claims, but instead makes clear that the compound of claim 1 is a polymer. As mentioned at page 13, lines 5-6, the polymer may be a homopolymer or a copolymer. Reference to group M as representing a repeating monomer unit simply indicates that it forms part of the backbone of the polymer along with other monomer groups. The scope of claim 1 should be clear in view of the amendment and explanation above.

Claim 4 recites a number of options for the definition of group M. The Examiner stated that the claim was indefinite because it provides names of compounds, rather than radicals, for the monomer unit. Applicants respectfully traverse this rejection. Those skilled in the art can routinely refer to the named monomer groups as written in claim 4. The naming of compounds as possible M groups does not distort the understanding of the group as a monomer within the polymer as a whole. As an analogous example, the naming of "ethylene" monomer units (named as a compound, not as a radical) within the polymer of "polyethylene" does not confuse one skilled in the art as to the scope of the polyethylene polymer. The subject matter of the claims allows one skilled in the art to recognize that the named groups will be used as units to form the polymer backbone to which the side chains are attached via B<sup>4</sup>.

Claim 5 made reference to "one or more pre-finished monomer units of formula (I)," and the Examiner stated that the term "pre-finished monomer" was indefinite. Although applicants do not agree, claim 5 has been amended to make reference to the monomers of formula (I).

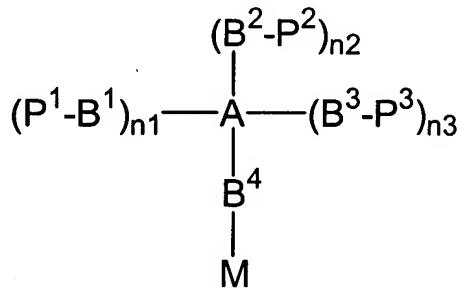
Claim 6 was rejected because of the phrase "functional-polymer analogue of a polymer according to claim 1." Although applicants disagree that the phrase is indefinite, claim 6 has been amended to recite the same invention in a different way.

Support for the amended claim appears in the original claim and in the specification at page 24, lines 12-13.

### III. Rejection under 35 U.S.C. § 103(a)

Claims 1-7, 10 and 11 were rejected under 35 U.S.C. §103(a) as unpatentable in view of U.S. Patent No. 5,602,661 to Schadt et al. ("Schadt"). In support of the rejection, the Examiner mentioned that Schadt discloses an orientation layer for liquid crystals, where the orientation layer comprises a photo-orientable polymer network ("PPN"). Three example PPNs disclosed as PPN1, PPN2 and PPN3 appear in cols. 2-3 of the Schadt patent. The Examiner stated that these example PPNs disclosed monomer units M, spacer groups B and photoactive groups P as claimed in claim 1 of the present application. The Examiner concluded that the claimed polymers would have been obvious in view of the more specifically described compounds disclosed in Schadt. Applicants respectfully traverse this rejection.

The polymer of claim 1 comprises units of formula (I):



with a proviso that  $1 < n^1 + n^2 + n^3 < 4$ . The proviso to the definitions of  $n^1$ ,  $n^2$  and  $n^3$  means that group A is ultimately substituted with at least two photoactive groups P, and possibly with three. This substitution results in a branched side-chain to the polymer backbone, with the branches comprising photoactive groups.

The polymers PPN1, PPN2 and PPN3 of the Schadt patent do not comprise a group A as claimed that is ultimately substituted by two or possibly three photoactive groups. Instead, those polymers contain side chains having a linear structure compared to the branched structure of the claimed polymers. There does not appear to be any

suggestion to one skilled in the art to modify the PPN1, PPN2 or PPN3 polymers from the disclosed linear structures to branched structures as claimed. For at least this reason, the claimed polymers would not have been obvious in view of Schadt. Applicants therefore respectfully request that the Examiner withdraw this rejection.

Claims 1-7 and 10-13 should be in condition for allowance in view of the preceding amendments and remarks. If there is any fee due in connection with the filing of this Amendment, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,  
GARRETT & DUNNER, L.L.P.

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By:   
Steven J. Scott  
Reg. No. 43,911